

Natural analogue study of bentonite-iron interaction, alteration of bentonite with reducing iron rich fluid

Keisuke Fukushi[1]; Tomonori Sugiura[2]; Tomoaki Morishita[3]; Noriko Hasebe[4]; Noritaka Endo[5]; Hiroshi Ito[6]

[1] KINET; [2] Earth Science, Kanazawa Univ.; [3] FSO, Kanazawa Univ.; [4] K-INET, Kanazawa Univ.; [5] Kanazawa U. Earth Sci.; [6] Kunimine Industry co., Ltd

It is proposed that high-level nuclear wastes (HLW) will be disposed in underground repositories, where steel overpack containing HLW is surrounded by the bentonite-sand buffer. After extremely long period of time, steel overpack will corrode and react with the adjacent clay materials. The interaction may affect the properties of the clay. The effects of interaction on the stability of clay materials have received much attention. Very recently, a number of laboratory experiment and geochemical modeling in regard to the iron-clay interaction have been performed. However, it has been sometimes questioned that such short-term laboratory experiments and the geochemical modeling based on solely the laboratory results can predict the long-term phenomena occurred in the actual disposal environments. In order to gain the plausible prediction of long-term iron-bentonite interaction, we start the project for natural analogue study of iron-bentonite interaction by the research team consisting geochemists, petrologists, clay mineralogists, chronologists and hydromorphologists.

Kawasaki deposits at Miyagi prefecture is one of major bentonite deposits in Japan. We found the formation of greenish vein in the deposit, which suggest the alteration of bentonite by the interaction with iron-rich fluid. We will report the preliminary results of the alteration of bentonite by iron-rich fluid at Kawasaki deposits for the natural analogue study of iron-bentonite interaction.